

U.S. Patent Application No. 09/833,202
Amendment dated February 16, 2006
Response to Office Action of November 17, 2005

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) A The fuel cell of claim 17, comprising a gas diffusion electrode, a gas diffusion counter-electrode, a solid electrolyte membrane located between the electrode and counter-electrode, wherein the electrode or the counter-electrode or both comprise at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group, and wherein an active layer having a thickness of about 5 microns or less is present in said gas diffusion electrode or counter-electrode, or both wherein said active layer has a thickness of 10 microns or less in said gas diffusion electrode or counter-electrode or both.

2. (Withdrawn) The fuel cell of claim 1, wherein said solid electrolyte membrane comprises at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group.

3. (Currently amended) The fuel cell of claim 1, wherein said gas diffusion electrode and gas diffusion counter-electrode each comprise a blocking layer and ~~an~~ said active layer.

4. (Currently amended) The fuel cell of claim 3, wherein ~~said active layer or said blocking layer or both comprise~~ comprises at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group.

5. (Previously presented) The fuel cell of claim 3, wherein said active layer has a

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thickness of from 2 microns to about 5 microns.

6. (Currently amended) The fuel cell of claim 3, wherein said active layer further comprises ~~at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group and a metal catalyst.~~

7. (Original) The fuel cell of claim 3, wherein said active layer has no fluoropolymer binder present.

8. (Currently amended) The fuel cell of claim 1 wherein said solid electrolyte membrane comprises ~~polytetrafluoroethylene~~ a fluoropolymer.

9. (Withdrawn) A fuel cell comprising a gas diffusion electrode, a gas diffusion counter-electrode, a solid electrolyte membrane located between the electrode and counter-electrode, wherein said solid electrolyte membrane comprises at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group.

10. (Original) The fuel cell of claim 1, wherein said organic group is $-C_6H_4SO_3^-$.

11. (Withdrawn) A method to reduce the thickness of a solid electrolyte membrane comprising forming said electrolyte membrane with a modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group.

12. (Withdrawn) A method for increasing catalyst accessibility in an electrode comprising forming an active layer with a modified carbon product in the absence of a fluoropolymer binder, wherein said modified carbon product comprises a carbon product having attached at least one organic group.

13. (Withdrawn) The method of claim 12, further comprising the deposition of a

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catalytic material on said modified carbon product.

14. (Canceled)

15. (Withdrawn) The method of claim 11, wherein said organic group is a proton conducting group, an electron conducting group, or both.

16. (Withdrawn) The method of claim 12, wherein said organic group is a proton conducting group, an electron conducting group, or both.

17. (Currently amended) A fuel cell comprising a gas diffusion electrode, a gas diffusion counter-electrode, a solid electrolyte membrane located between the electrode and counter-electrode, ~~wherein the electrode or the counter-electrode or both comprise at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group, and wherein said~~ the fuel cell comprises an active layer ~~comprises~~ comprising a carbon support that comprises at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group that is proton-conducting and, wherein catalyst particles are directly on the carbon support.

18. (Previously presented) The fuel cell of claim 17, wherein said catalyst particles are metal catalyst particles.

19. (Previously presented) The fuel cell of claim 17, wherein said catalyst particles comprise Pt.

20. (Previously presented) The fuel cell of claim 17, wherein said active layer has a thickness of from about 2 microns to about 5 microns.

21. (Previously presented) The fuel cell of claim 17, wherein said catalyst particles

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are attached or adsorbed onto the modified carbon product.

22. (Previously presented) The fuel cell of claim 17, wherein said active layer is formed directly on the solid electrolyte membrane.

23. (Previously presented) The fuel cell of claim 21, wherein said catalyst particles that are attached or adsorbed onto the modified carbon product comprise a cationic metal catalyst complex that is attached or adsorbed onto the modified carbon product.

24. (Previously presented) The fuel cell of claim 21, wherein said catalyst particles that are attached or adsorbed onto the modified carbon product is a catalyzed treated carbon product.

25. (Previously presented) The fuel cell of claim 24, wherein said catalyzed treated carbon product is partially or fully hydrophobic.

26. (New) The fuel cell of claim 17, wherein said modified carbon product is hydrophobic.

27. (New) The fuel cell of claim 17, wherein said modified carbon product further comprises hydrophobic groups.

28. (New) The fuel cell of claim 17, wherein said active layer further comprises a second modified carbon product having attached hydrophobic organic groups.